# ARRL PSCM, App. B, NTS METHODS AND PRACTICES GUIDELINES

## CHAPTER 6 - NTSD - RADIO-EMAIL - W3YVQ MPG6V14A-3/14

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**MPG6A3   NTSD MBO BATCH FILE IMPORT/EXPORT GUIDANCE with IMAGES**
Using Batch Files with the Winlink Classic MBO including screen shots.
**MPG6A4   ARRL NATIONAL WL2K TARGET STATION DATABASE GUIDANCE**
ARRL secure and dynamic Target Station list via Radio-email.
**MPG6A6   WL2K TACTICAL ADDRESS GUIDANCE - PACLINK CLIENT**
Suggested format for 3 to 12 character WL2K Tactical Address accounts.
**MPG6A8   BATCH FILE & PLAIN TEXT GUIDANCE,**
*Radio-email* formatting for NTSD Batch Files, Email, and Radiograms.

## LINKS

**Winlink 2000 (WL2K) Home Page:** http://www.winlink.org
**AirMail Home Page:** http://www.airmail2000.com
**AGWPE Pro:** http://www.elcom.gr/sv2agw

## 6. MPG 6 - DIGITAL - INTRODUCTION

This updated Chapter 6 of the MPG contains the guidelines for **NTS-Digital** (NTSD) and the new *Radio-email* systems used in the ARRL Field Organization.

**NTSD (6.1), WINLINK CLASSIC:**
The NTS-Digital (NTSD) system has been in operation for many years providing a digital messaging service for ARRL text Radiograms via a fleet of MBO stations and keyboard Digital Relay Stations (DRS) at Area, Region and Section levels of the NTS. It operates in parallel with, and sharing traffic responsibilities with, the manual NTS messaging service. (**Note** that the NTSD uses the older Winlink Classic BBS type software for MBO Radiogram posting, downloading, and forwarding. This is a BBS mode and distinctly different from the Winlink 2000 system used for transporting *Radio-email*, but many NTSD stations are also clients on the Winlink 2000 network.)

**RADIO-EMAIL (6.2), WINLINK 2000, AIRMAIL:**
The developers of the Winlink 2000 (WL2K) Radio-email network and the creator of the AirMail client (KE6RK) have provided us with means to send email-formatted messaging over amateur radio. "The Winlink 2000 system has become a reliable means for providing contingency communications for all levels of government and non-government organizations involved with Emergency Communications." (*The Amateur Radio Public Service Handbook*, First Ed. 2012, Chapter 22, p. 181.) Since WL2K and AirMail have experienced widespread deployment in the NTS, NTSD, and ARES(r), this section of the MPG is provided to help establish uniform protocols for their use, and to provide a bridge between all three groups for both Radiogram and Radio-email messaging. This Radio-email technology is but one of many digital tools available to amateurs. WL2K and AirMail guidelines given here are not intended to set the use of those technologies as standard, but rather to provide assistance in their effective use for Emergency Communications.

The *Radio-email* system provides the means for stations operating in the ARES®, NTS, and NTSD to intercommunicate through common email-formatted messaging, and independently of ground infrastructure. This may be done on the WL2K common communications layer with rapid delivery capability in order to enhance total served-agency interoperability, public welfare services, and cross-platform coordination. Public welfare services may be provided directly from shelters or agencies via *Radio-email* to public internet addresses, and email replies may be received, all without the use of any intermediate relaying manpower. Likewise, messaging in the standard ARRL Radiogram text format may be carried by *Radio-email* to stations anywhere in the system or public internet capable of delivering them. The NTS and NTSD also provide for the movement of *Radio-email* long haul without the need for any connection to the public internet. The *Radio-email* system is intended to augment, not replace, all the other tools available to provide emergency communications and public service. (**Note** that Winlink 2000 is an email client-to-client transport system, not a BBS type system like the one used by NTSD MBOs for Radiogram handling.)

**6.1 NTSD - GUIDELINES**

**6.1.1 NTSDGD4 - EAS/CAS/PAS - 6/2001**

**I. SCOPE AND PURPOSE**
The NTS Digital System (NTSD) is a continuous system of computer-assisted, automatic digital stations, serving as Mailbox Operations (MBOs), each under the control of a system operator (sysop). Forwarding operations occur on both a fully automated basis and manually depending upon prevailing circumstances, routing plans and sysop preferences. MBOs access other system MBOs automatically or manually, and "keyboard" operators access MBOs manually. The NTSD handles text Radiograms in the standard ARRL message format.

This Guidance supplements NTS Area Terms of Reference, and should be interpreted consistent with the Public Service Communications Manual (PSCM), Section II, published by the ARRL. It describes routing approaches, sets NTSD station roles and coordination standards, and outlines generally accepted principles and practices within the NTSD.

Please note: The NTSD operating system uses the older "Winlink Classic" (v2.9/3.0) BBS/MBO software used to transfer and post text Radiograms for distribution and downloading. The Winlink 2000 (WL2K) system is a totally different global *Radio-email* messaging system that operates more like regular email. WL2K is discussed in the *Radio-email* section 6.2 below.

**II. NTSD ROUTING APPROACHES**
Area Digital Coordinators (ADCs) have the flexibility to implement a variety of routing plans consistent with NTS principles and other requirements. One approach uses Area Digital Hubs -- MBO stations designated in the three geographical areas, Eastern, Central and Pacific by the respective ADCs, providing scheduled inter-area forwarding and coordination. This approach permits ADCs the flexibility to establish one or more such MBOs to achieve a systematic and scaled digital-routing plan under this Guidance. The area hub approach has access and capacity limitations. Another approach is an "open system" in which any digital station may forward to an MBO within an area at any time. This approach increases flexibility, but, to some extent, requires more effort by keyboarding operators to locate and poll traffic coming into a region or area.

**III. COORDINATION AND ROLES**
ADCs exchange information with respect to status and operation of MBOs and disseminate received information to the NTS levels within the area. ADC-designated digital station operators making changes will consult with and issue information through the ADC.

   A.  **AREA DIGITAL COORDINATORS**
       **1. Qualifications** – ADCs must presently serve as an NTSD MBO sysop or have past MBO sysop experience and have the capability to promptly activate such an operation.

**2. Duties** – The ADC duties include the following:
  a) Designate digital stations at the region and area levels;
  b) Assign digital stations to a MBO polling schedule;
  c) Issue standard operating procedures;
  d) Issue certificates in recognition of participation;
  e) Coordinate the standard frequency plan; and
  f) Collect digital statistics and report activity.

**B  STATION OPERATIONS.** Digital station operators perform functions consistent with Area, Region and Section responsibilities as prescribed for the NTS in accordance with the PSCM. Digital station operations at the NTS section and local level are the responsibility of the Section Traffic Manager (STM). To the extent feasible, ADCs should coordinate digital operations with the STMs.

**1. AREA/REGION HUB MBOs** -- One or more stations are designated by the ADC as a Hub or as Hub backups and perform forwarding tasks according to the digital routing plan.
These stations:
  a) Operate fully automatically under computer control;
  b) Scan multiple bands according to prescribed plan;
  c) Auto-forward according to prescribed schedules; and
  d) Submit reports and station information to the ADC.

**2. DIGITAL RELAY STATIONS (DRS)** -- Perform functions of relay involving posting of message files and removing traffic from NTSD MBOs for appropriate nets or TCC functions in support of NTS objectives observing NTSD principles and practices. DRSs are designated by the ADC and:
  a) Perform assigned relay duties to clear area MBOs
  b) Route incoming traffic via area/region nets
  c) Handle assigned TCC schedules and traffic
  d) Submit periodic reports as required.

**IV. DIGITAL STATION OPERATING PRINCIPLES AND PRACTICES**
  **A**  NTSD operates in parallel with the other NTS nets and circuits but on a continuous basis and at all levels. Access is available to all, both "keyboarders" and sysops consistent with prescribed NTSD station roles and this Guidance. Roaming in other areas is discouraged except as necessary to accomplish manual forwarding due to system failures. Stations may be excluded for causing interference or unauthorized removal of traffic.

  **B**  NTSD has established a core of common frequencies covering all bands that provide suitable propagation. Area and Regional MBOs may add additional frequencies for their own forwarding use but are not required to publish the additional frequencies. This core list may change from time to time but provisions must be coordinated through the ADC with the NTSD sysops within the area. All NTSD MBOs are expected to scan the core list frequencies.

  **C**  MBO sysops are encouraged to provide multiple modes, with an emphasis on

the faster ones. Ideally an NTSD MBO should be available on PacTor-II/III. VHF packet should be used to provide higher speed access for local "keyboarders".

(Note: MBOs may wish to offer PacTor-I for stations with older TNCs. Forwarding between MBOs may also be done using **Batch Files** carried by *Radio-email*. See Section 6.2)

The use of VHF packet should be limited to those BBSs KNOWN to be reliable for NTS use. General packet circuits should never be used to route NTS traffic. In general, a single relay by packet represents a reliable disposition of NTS formatted traffic. HF packet should NEVER be used to forward NTS traffic.

**D** NTS traffic received into NTS digital circuits will be routed via NTS circuits and/or nets except in rare emergency cases when no NTS outlet is then available or some other more expeditious and reliable route is available. Such exceptions should not become the basis for establishing a routine circuit for such traffic.

**E** NTSD sysops should handle their traffic giving due regard to message precedence, just as is done in the cyclic nets.

**F** TCC stations may use NTSD circuits to forward traffic routed through schedules. Such traffic may be placed on the selected MBO by the sending TCC station and removed by the receiving TCC station. Use of the "P" type may be necessary to ensure that ONLY the receiving TCC station gets the traffic. Standard reports to the appropriate TCC Director are required, and traffic sent or received using type "P" should be counted as though it had been "T".

**G** Counts of traffic received and traffic forwarded should be reported by the individual MBO sysop to the ADC. Originations and deliveries are not included in these reports but should be reported to the STM as part of the Station Activity Report (SAR).

**H** NTS digital stations are expected to forward or ensure delivery of all traffic on hand in a timely manner. If a station experiences a system failure it is the sysop's responsibility to find a way to clear the traffic on hand. If it is not possible to extract all messages on hand from the failed disk drive, then that sysop must notify at least one of the other NTSD sysops (preferably the ADC) and ask that a notice be passed throughout the system advising of the failure. Any sysop who has recently passed traffic to the failed MBO should then review the situation and reinstate any messages so forwarded. The sysop of the failed MBO should, after recovery, try to establish which messages were on hand, pass a list of them to all other NTSD sysops for further follow up and place all of them on hold. When sufficient time has passed that no further demand is expected to be made regarding these messages the failed MBO sysop may delete them.

**J** MBO sysops should participate at least occasionally in their local and section

nets to maintain cyclic net proficiency.

**K** Since the NTS Digital System operates on a continuous basis, traffic should never be removed from an NTS MBO and taken to a cyclic net for later transmission unless it has reached the (digitally serviced) point nearest its destination. There is one exception to this: if an opportunity exists to DIRECTLY DELIVER a message to a station for delivery through the net, then it is proper to remove the traffic from the MBO. Removing traffic from an MBO to increase the traffic count of a cyclic net only delays traffic and is not an acceptable practice.

**L** Keyboarder stations are responsible for ensuring that messages they remove from a BBS or MBO are marked as forwarded (that is their status is changed to "TY" or "TF". Failing to do so will lead to duplicated attempts to relay and deliver such messages. Likewise, Keyboarders should NEVER download messages marked as already forwarded.

## V. AREA DIGITAL STANDARD OPERATING PROCEDURES

ADCs are authorized to develop and implement Area Standard Operating Procedures (SOPs) for the designated NTSD stations within the area. Such SOPs shall be consistent with this Guidance and shall be filed with the Area Staff Chair and League headquarters.

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## 6.1.2 NTSD & NTS NATIONAL EMCOMM

NTSD and NTS Target Stations equipped for WL2K operation will be able to operate on a common network with all similarly equipped ARES®, NTS and NTSD stations, stations in other services, and stations available on the public internet, in order to exchange Radiogram and *Radio-email* messaging for served agencies and the public. *Radio-email* common messaging networking, therefore, can dramatically augment the operation of the NTSD, particularly with respect to the movement of bulk traffic to and from the "last mile" disaster environments, between MBOs, and to message delivering stations anywhere. As noted in Section 6.2, the NTSD stations can provide national *Radio-email* EMCOMM communications, radio-all-the-way, in areas suffering loss of infrastructure.

## 6.1.3 NTSD REFERENCES

See **MPG6A1**, NTSD Station Operation Procedures, for the original uploading, downloading and bulk handling information;

See **MPG6A8**, Batch File & Plain Text Guidance, for information on entering Radiograms into Radio-email; and for addressing, subject line information and confirmation guidance for Radio-email of the various types.

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## 6.2 RADIO-EMAIL GUIDELINES - ARES®/NTS/NTSD

## 6.2.1 RADIO-EMAIL SYSTEM SCOPE AND PURPOSE

The *Radio-email* system is intended to provide real-time, continuously operating, nation-wide digital messaging services in the standard email format between all stations at served agencies, at stations where the public has welfare messaging needs, and at stations coordinating the amateur emergency response, etc.; all on a common communications plane. The *Radio-email* system uses resources of ARES®, NTS and NTSD stations operating on the Winlink 2000 (WL2K) network and the capability of such stations to exchange *Radio-email* station-to-station, radio-all-the-way. The purpose is to provide, as much as practical, total agency interoperability and welfare automated messaging services on a real-time basis without the need for intermediate amateur radio relaying manpower. The *Radio-email* system provides messaging in the modern email format with multiple addressees and copes plus binary attachments, is in continuous operation, and can carry ARRL text Radiogram traffic as well.

Client stations provide *Radio-email* service by accessing the WL2K network via telnet over the internet, via radio through packet or HF Gateway stations, or using direct station-to-station transfers. Gateway stations provide access to the WL2K network by linking packet or HF stations to the network. Software used by packet Gateway stations can provide for continued automatic *Radio-email* operation for packet clients within the "last mile" during infrastructure loss, and provide an HF link to other WL2K HF Gateway stations for messaging to addressees outside the "last mile".

The nature of the WL2K network and radio-all-the-way messaging system thus provides a means for the practical integration of the ARRL Field Organization's NTS, NTSD, and ARES® messaging services. Here we use the terms 1) NTS to include the system of manual Local, Section, Region, Area nets and TCC operations and their *Radio-email* capabilities; 2) NTSD to include the NTS-Digital Winlink Classic MBO system, Digital Relay stations, and NTSD *Radio-email* capabilities via WL2K and existing long-haul station-to-station modes; and 3) ARES® to include stations operating at Section level deployed to provide emergency communications at served agencies (Government and non-government) and at shelters and other locations within the "last mile" where normal infrastructure is overloaded, damaged or destroyed, and their *Radio-email* capabilities. Since stations in all three categories can access the *Radio-email* system, they may all exchange messaging virtually real-time in the *Radio-email* format including ARRL Radiogram content as needed.

The Winlink 2000 network has been developed and is maintained by the Winlink Development Team (WDT). ARRL Field Organization stations are welcome to use the network subject to the terms of reference provided by the network administrators and the WDT (Winlink 2000 web home page: www.winlink.org.). This is a network separate from the older Winlink Classic operating system used by NTSD MBOs.

This Guidance supplements the NTS Area Terms of Reference, and should be interpreted in a manner consistent with the Public Service Communications Manual (PSCM), Section II, published by the ARRL. It provides guidance for client and Gateway strategies, station roles and coordination standards, and generally accepted

principles and practices within the *Radio-email* system.

**6.2.2 WINLINK 2000 SYSTEM - SOFTWARE - HARDWARE**
The Winlink 2000 (WL2K) system is a global network established to provide email messaging over amateur radio. The network consists of a fleet of mirrored Central Message Servers established in the US and around the world which can be accessed over the internet, via local packet Gateway stations, and via HF PacTor or WINMOR Gateway stations. In addition, software modules are provided to permit continued communications during infrastructure loss. Some of the applications are discussed below. (Check the Winlink.org web site for the latest information on upgrades to the system and software.)

**6.2.2.1 CLIENTS**

**PACLINK CLIENT**
Paclink is WL2K free client software (winlink.org) which runs on Windows XP™-Vista™-Windows 7™, using the Dot Net Framework 3.5 or later (free Microsoft download). It may be used with AGWPE Pro with any packet "Kiss" TNC, and is used with "Outlook Express" or any other standard POP-3/SMTP email application. Paclink connects to the WL2K CMS via telnet/internet, packet, and HF PacTor (using the SCS PTC-II modems), and can register Tactical Addresses. Paclink uses five channels to permit automatic switching of the connection path as required; and can be programmed to automatically check for mail on telnet/internet and packet radio. Paclink is controlled by the local registered client operator.

**RMS-EXPRESS**
The **RMS-Express** free client software, which runs on Windows XP™-Vista™-Windows 7™- Windows 8™, using the dot net framework, provides for WL2K connectivity via telnet/internet, packet, HF PacTor, and the software sound card implementation of HF WINMOR (approximating PacTor-II) requiring no external TNC, and permits station-to-station transfers via radio. It is generally the preferred WL2K client software package. See the winlink.org web site for the latest details.

**AIRMAIL CLIENT**
AirMail is free client software from KE6RK (airmail2000.com) which runs on Windows 95™ through Windows 8™, stand-alone. AirMail uses a built-in telnet driver for WL2K access through the computer's internet connection, a fixed list of built-in drivers for packet TNCs, and the drivers for the SCS PacTor HF modems. AirMail connects to the WL2K CMS via telnet/internet directly, and via packet radio and HF PacTor Gateway stations; and can be programmed to automatically check for mail on telnet/internet and packet radio. AirMail uses its own built-in email application, and is controlled by a local registered client operator. AirMail permits direct station-to-station *Radio-email* transfers via radio. It is also widely used by NTSD operations on the older B1F protocol.

**6.2.2.2 GATEWAYS**

**RMS-PACKET GATEWAY**

The RMS-Packet module is WL2K free Gateway software (winlink.org) providing a bridge between packet radio clients through an external packet TNC and radio (and others linked via 802.11, etc.) and internet connections to the WL2K CMS. The module runs on Windows XP™ through Windows 7™ using the Dot Net Framework 3.5 or later (free Microsoft download), and may be run on the same computer with client applications. May be used with AGWPE Pro with any packet "Kiss" TNC, and may share radio/TNC hardware with co-located client(s). The RMS-Packet module is registered with the WL2K System Administrators and controlled by the local operator.

### RMS- Tri-mode GATEWAYS
The RMS-Tri-mode module is WL2K free Gateway software (winlink.org) used with the SCS HF PacTor I/II/III modem and/or soundcard interface providing a bridge between HF PacTor and WINMOR radio clients and internet connections to the WL2K CMS. The Gateway module runs on Windows XP™ through Windows 8™ using the Dot Net Framework 3.5 or later (free Microsoft download), and may be run on the same computer with client or packet Gateway applications. The RMS-PacTor module is registered with the WL2K System Administrators and controlled by the local operator.

### 6.2.2.3 SERVERS

### RMS-RELAY
The RMS-Relay module is a WL2K free Gateway level server application (winlink.org), running on Windows XP™ through Windows 8™ using the Dot Net Framework 3.5 or later (free Microsoft download). RMS-Relay provides the link between a Gateway and the internet connection to the WL2K CMS via the internet. When the internet fails, the Relay module automatically reverts to a fully automatic email server for all its known Gateway packet clients. A built-in port to the Tri-mode software module HF enables connecting the Relay module over HF PacTor-III, using the SCS modem, to any WL2K RMS-Tri-mode Gateway of choice in order to handle *Radio-email* outside of the local Gateway's domain. RMS-Relay is registered with the WL2K System Administrators and controlled by the local operator. (Sections may deploy backbones, node switches, digi-peaters, etc., to permit ARES® stations to reach either functioning Gateways with internet or ones equipped with the RMS-Relay to sustain their local area networking. Thus, those networks able to reach the RMS-Relay become infrastructure independent.)

### CMS
The CMS modules are the primary fleet of global WL2K message servers. Multiple units operate around the world and are mirrored such that any one of them can sustain the entire WL2K network at any time. They are run by the WL2K System Administrators and not available for local deployment.

### 6.2.2.4 OPTIONAL WINLINK 2000 SUPPORT PROGRAMS
### AGWPE Pro:
AGW Packet Engine software interface (elcom.gr/sv2agw) provides for multiple channels of application connection and multiple output connections for a variety

of ports to TNC/radio connections. AGWPE can be programmed for multiple path connections with expected connection scripts. It runs in the background on the client or Gateway computer. (Free demo available, but the inexpensively priced Pro version is easier to set up and run unattended.)

**AMPE:**
AMPE (AMPE16) may be used to interface with AGWPE, and through the Lantronix virtual port redirector (stub32i via the red32bit download installer), to permit AirMail to work with various additional TNCs other than those provided for in the built-in drivers. (Links and instructions available through the NTSD ADCs.)

**ITSHFBC:**
ITSHFBC is a propagation prediction program that can be used by RMS Express and Airmail (the ICEPAC download).

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### 6.2.3 TARGET STATIONS - RADIO-EMAIL
The ARRL Field Organization *Radio-email* system is composed of all properly equipped ARES®, NTS, and NTSD WL2K client and Gateway stations, each under the control of an appropriately licensed operator, capable of accessing the Winlink 2000 (WL2K) global network or providing station-to-station transfers.

Stations providing the essential contact points for agency, welfare and administrative messaging may be designated as **Target Stations** for the purpose of providing known network addresses for such messaging. A Target Station is simply a properly equipped station with a "known" client call sign or Tactical Address on the WL2K network. The designation of such "known" addresses is the essence of ensuring that all stations needing to communicate during emergencies may readily do so.

#### 6.2.3.1 SECTION TARGET STATIONS - ARES®/NTS/NTSD

**SPTS - SECTION PRIMARY TARGET STATIONS**
Section leadership may designate a Section Primary Target Station capable of representing the Section on the global WL2K network. Such stations should be capable of checking the WL2K network daily (or more often during emergency activation) via telnet, packet, or HF, to ensure that the Section staff may exchange *Radio-email* with other Section and NTS/NTSD Target stations at any time. Checking for mail daily ensures that the Section Primary Target Station and the network links are functional.

Multiple stations may perform the function of the Section Primary Target Station. For example, a station may check WL2K daily using telnet/internet until no longer able to use its internet connection. The same or a different station may then assume the role by checking WL2K via a functioning packet Gateway. If no packet Gateway connection can be made, the same or a different station may then assume the role by checking WL2K via HF Gateways. The function of these stations is to be able to receive and send *Radio-email* for the Section, and receive alerts for the Section, as needed but at least on a daily basis.

The Section Primary Target Station should be able to communicate with the Section leadership at all times with or without use of the normal ground infrastructure. The Section Primary Target Station(s) will be equipped as required to exchange *Radio-email* with other outside Section and NTS/NTSD Target Stations via station-to-station transfers.

The call sign(s) and Tactical Addresses of the Section Primary Target Station(s) will be shared in a confidential national ARRL database with other ARRL WL2K network stations, and will be updated dynamically by the Section staff as necessary, indicating the active duty station. These addresses will be used for national Section alerting and assistance requests, public and agency messaging, and coordination with ARRL HQ.

See the **MPG6A4** Target Station Database Guidance.

### SATS - SECTION ARES® TARGET STATIONS

The Section SEC may also designate WL2K Section ARES® Target Stations to handle *Radio-email* messaging as client stations deployed at served-agencies and EOCs, for command and intelligence gathering under NIMS/ICS organizational activity, for coordination of the deployment of ARESMAT and other ARES® responders, for outbound and incoming public *Radio-email* traffic, and as liaisons with local and wide-area nets, etc. Some of these Target Stations may be active only during emergencies. Identification of such Section ARES® Target Stations facilitates total agency interoperability within the Section and with other Target Stations anywhere. The client addresses of such stations thus may be used by officials generating messaging for participating organizations. Station(s) will be equipped as required to exchange *Radio-email* with other outside Section and NTS/NTSD Target Stations via station-to-station transfers.

The list of such Section ARES® Target Stations may be held locally, or may be shared in total or in part with other Sections activated in an emergency as the staff deems advisable pursuant to Section MOUs or other agreements. These Target Station call sign and Tactical Address lists will provide the addresses to be used by Section WL2K stations for routing *Radio-email* traffic within the "last mile" during emergencies or for other internal messaging needs. The Section may elect to list some of these stations to be shared in the confidential ARRL database with other ARRL WL2K network stations, and will be updated dynamically by the Section staff as necessary.

See the **MPG6A4** Target Station Database Guidance.

### SNTS - SECTION NTS/NTSD TARGET STATIONS

The Section STM may also designate one or more Section NTS/NTSD Target Stations to handle WL2K messaging for daily public traffic in Radiogram and email format exchanged with other ARES®, NTS and NTSD stations. These stations will be used for routing national public traffic requiring manual delivery within a Section when normal NTS or NTSD pathways are not available or overloaded, and when the email format is required. During emergencies, such stations may also facilitate handling of outbound welfare traffic in Radiogram or

email format; and provide routing of incoming welfare inquiries in Radiogram or email format for archiving, BBS/MBO posting, or relay to relief agencies, etc. Station(s) will be equipped as required to exchange *Radio-email* with other outside Section and NTS/NTSD Target Stations via station-to-station transfers.

The list of such Section NTS Target Stations may be held locally, or may be shared in total or in part with other Sections activated in an emergency as the staff deems advisable pursuant to Section MOUs or other agreements. These Target Station call sign and Tactical Address lists will provide the addresses to be used by Section WL2K stations for routing traffic within the "last mile" during emergencies or for other internal messaging needs. The Section may elect to list some of these stations to be shared in a confidential ARRL database with other ARRL WL2K network stations, and will be updated dynamically by the Section staff as necessary.

In order to provide daily liaison with the national NTS, NTSD, and ARES$^®$, at least one Section NTS/NTSD Target Station should be assigned, and its address should be shared with the NTS, NTSD, and ARES$^®$ leadership via the national ARRL database. Although the Section Primary Target Station could be used for such liaison, this Section NTS/NTSD assignment moves the daily traffic workload to a devoted Target Station. This station might be the STM, a Net Manager, or other station in daily contact with the Section or Local nets, capable of handling Radiogram and email formatted messaging.

See the **MPG6A4** Target Station Database Guidance

**SECTION RMS-PACKET GATEWAYS WITH RELAY**
Section stations providing WL2K RMS-Packet Gateway service may use the WL2K RMS-Relay module to sustain local automatic *Radio-email* service during loss of infrastructure. The RMS-Relay module also provides the means to connect the Gateway to the global WL2K network via other WL2K HF Gateway stations in such circumstances, thus the connection to the global WL2K network is sustained. Target Stations operating on the local area packet network with access to such a packet Gateway (equipped with the Relay module) may therefore be accessible as Section ARES$^®$ or NTS/NTSD Target Stations.

**6.2.3.2 NTS TARGET STATIONS - MANUAL NET SYSTEM**

**NTSTS - NTS TARGET STATIONS**
The NTS TCC, Area and Region staff may designate WL2K NTS Target Stations (above Section level) to handle messaging for NTS daily public traffic and ARES$^®$ traffic exchanged with NTS, NTSD and ARES$^®$ stations anywhere. These addresses will be used for routing *Radio-email* and text Radiograms between the NTS and all other stations using *Radio-email*, including those on other system nets. A Section ARES$^®$ or NTS/NTSD Target Station may use *Radio-email* to send Radiograms as well as *Radio-email* formatted messaging directly to any ARES$^®$, NTS, or NTSD Target Station anywhere on the WL2K network without the need for intermediate relaying manpower. Such stations may also transfer *Radio-emails* station-to-station via packet radio, HF PacTor, or HF WINMOR, if

properly equipped.

The call signs and Tactical Addresses of designated NTS WL2K Target Stations will be shared in a confidential ARRL database with other ARRL WL2K network stations and will be updated dynamically by the respective staff as necessary. Other NTS Target Station addresses may be held private for NTS station and staff use as deemed appropriate.

Messaging in the *Radio-email* format, or *Radio-email* carrying Radiograms, may be listed on manual voice and CW nets to be dispatched to available Target Stations checked into those nets. All NTS Area and Region nets should encourage and register liaisons to the WL2K network as well as those capable of station-to-station transfers of *Radio-email*, to interface with the NTS, NTSD, and ARES® stations anywhere. See the Section on **Special Radio-Email Routing Considerations, 6.2.10**.

### 6.2.3.3 NTSD TARGET STATIONS - MBOs

**NTSDTS - NTSD TARGET STATIONS**
The NTSD Area Digital Coordinator (ADC) may designate WL2K NTSD Area and Region MBO Target Stations to handle standard ARRL text Radiograms transported via *Radio-email* for NTS public daily and welfare traffic, and to handle *Radio-email* format messaging exchanged with ARES®, NTS, and NTSD stations anywhere. Such NTSD Target Stations should be capable of checking the WL2K network daily (or more often during emergency activation) via telnet, packet, HF PacTor, or WINMOR. They should also be prepared to receive and transfer *Radio-email* format messaging as necessary; to and from WL2K, the public internet, or via station-to-station transfers. This includes the two new types of traffic provided for in the *Radio-email* system; *Radio-email* for re-filing, and *Radio-email* with only Radiogram addresses. (See the **Message Types section, 6.2.7**.)

NTSD Target Stations should be capable of providing station-to-station, radio-all-the-way, handling of *Radio-email* via packet or HF as it may become necessary during infrastructure loss, thus providing national messaging services for all ARES®, NTS and NTSD stations. This includes both messaging in the *Radio-email* format and *Radio-email* carrying Radiogram text file attachments. A number of NTSD MBO stations equipped for PacTor-I/II/III are already performing this function. AirMail may be used as a client by any of these stations operating SCS modems. All NTS TCC, Area, and Region nets should encourage and register NTSD and WL2K liaisons, as well as those capable of station-to-station transfers of *Radio-email*, to interface with the NTS, NTSD and ARES® stations anywhere. Thus, the NTSD MBOs and DRS stations can provide the link to all such Target Stations for NTSD Radiogram and *Radio-email* handling.

A Section ARES® or NTS/NTSD Target Station may use *Radio-email* to send Radiograms as well as *Radio-email* formatted messaging directly to any ARES®, NTS, or NTSD Target Station anywhere on the WL2K network without the need for intermediate relaying manpower.

The call sign(s) and Tactical Addresses of designated NTSD WL2K Target Station(s) will be shared in a confidential database with other WL2K network ARRL stations and will be updated dynamically by the respective staff as necessary. Other NTSD Target Station addresses may be held private for NTSD station and staff use as deemed appropriate. See the **MPG6A4** Target Station Address Database Guidance.

**BATCH FILE FORMAT REQUIRED**
NTSD MBO Target Stations operating Winlink Classic MBO software may receive and originate *Radio-email* bulk transfers of Radiogram traffic using the **Batch File** format. All NTS, NTSD and ARES® stations sending text Radiograms via *Radio-email* to NTSD MBO Target Stations must use the **Batch File** format in attached text files to permit direct MBO importing of the Radiograms. NTSD MBO Target Stations may receive *Radio-email* carrying text Radiograms in the **Batch File** format for posting, sorting, and forwarding to other MBOs through the existing NTSD HF PacTor network defined in Section 6.1 of this chapter. See the **MPG6A8** Batch File & Plain Text Guidance, 6A8.1.2.

The NTSD MBO Target Station may also use *Radio-email* Batch Files for bulk transfer of Radiogram traffic between MBOs using WL2K and connections via telnet/internet, packet, and HF Gateways, and via station-to-station transfer. Transfers via WL2K telnet connections can dramatically lessen the impact on valuable HF spectrum, particularly when frequencies are needed for use by stations servicing the "last mile".

A Section ARES® or NTS/NTSD station may send Radiogram Batch Files and *Radio-email* directly to an NTSD MBO Target Station anywhere on the WL2K network without the need for intermediate relaying manpower.

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**6.2.4 TARGET STATION DATABASE**
The ARRL shall provide a password protected database with an interactive entry form and an information downloading capability available on the League server system. This database will allow Section ARES® and NTS/NTSD stations, and NTS TCC, Area and Region Target Stations, and NTSD Target Stations, to post and retrieve in real-time the Target Station addresses necessary for efficient routing of *Radio-email* nationally. Updating and retrieving Target Station addresses shall be possible via the *Radio-email* system via telnet/internet, packet, or HF (thus requiring an email submittal format and request format with email formatted replies from the database server).

Additional information may be entered into this database representing addresses for ARESMAT teams in the field and other ad-hoc deployments, served-agency Target Stations including wide-area services such as the Hurricane Watch Net (HWN), NWS-SKYWARN, etc.; liaisons with other communications providers such as MARS, and liaisons to wide-area service nets, etc.

See the **MPG6A4** Target Station Database Guidance.

## 6.2.5 ADDRESSING RADIO-EMAIL - CLIENT & TACTICAL ADDRESSES

### 6.2.5.1 GENERAL ADDRESSING
WL2K network stations are addressed as [call sign]@winlink.org (plus [Tactical Address]@winlink.org for Paclink clients). The "To:" and "Cc:" lines may contain WL2K network addresses and valid public internet addresses mixed, each separated by a comma; as in:
**w1aw@winlink.org,w1aw@arrl.org**

WL2K *Radio-email* can handle messaging with multiple addressees in the "To:" and "Cc:" lines, any subject in the "Subject:" line, a body text and attached binary attachments such as text, doc, gif, jpg, rtf files, etc. (Zipped and ".exe" files may be prohibited.) A WL2K client may not send a *Radio-email* to its own winlink.org address. SSIDs are permitted to identify separate client accounts using a common call sign, as in: "w1aw-1" and "w1aw-2", etc., but they are intended for use by the Winlink 2000 RMS-Express and Paclink clients, and are not intended be used with AirMail as a client account (even though they may work). (Also see winlink.org, FAQ 145.) WL2K address routing is automatic and dynamic, thus enabling any client to receive and send mail through any portal - telnet/internet, packet Gateway or HF Gateway anywhere.

### 6.2.5.2 ATTACHMENTS
Attachment (or total message) size may set to a low value for new WL2K clients or may be set to the desired size by sending a *system message* to the CMS. Attachment (or total message) size should be set based upon practical transmission time through the smallest bandwidth in the path to the addressee(s). The operator may always use a smaller message size below that limit at any time. Text files created with Notepad™ typically carry text Radiograms in plain text format or **Batch File** format, and can be limited in size by the creator. Separate messages may be sent when very large amounts of traffic must be handled.

### 6.2.5.3 WHITE LIST
An automatic yet customizable WL2K client white list provides spam protection at the CMS public internet interface. Each time a message is sent from the WL2K network to a public internet addressee, the internet address is posted in the client's white list. This enables the internet addressee to reply from the internet side. Other public internet users may not send regular email to the WL2K client account without their address or domain being posted in the client's white list. (See winlink.org for special exceptions.) A client may add and remove addresses and domains in his white list by sending a *system message* to the CMS. The white list does not come into play for messaging between clients on the WL2K network.

### 6.2.5.4 TACTICAL ADDRESSES - PACLINK CLIENTS
Tactical Addresses are 3 to 12 character alpha-numeric aliases which can be assigned to WL2K clients (registered over the internet from Paclink in advance of an emergency) to be used instead of the customary address, thus [Tactical Address]@winlink.org instead of [call sign]@winlink.org. See the topic below.

**6.2.6 TACTICAL ADDRESS GUIDANCE - PACLINK CLIENTS**
Tactical Addresses are 3 to 12 character alpha-numeric aliases which can be assigned to WL2K clients (registered over the internet from Paclink in advance of an emergency) in order to make addressing more intuitive for users, and to provide *Radio-email* to multiple addressees serviced on site by a single Paclink client station. Thus multiple officials' email accounts may be created to be served from one ARES®, NTS, or NTSD station deployed at an agency or field site. Messages for multiple registered Tactical Addresses are posted on WL2K as though they were separate client accounts, but are delivered to the client station which registered them. The Tactical Address client then collects its mail by accessing the amateur station's built-in Paclink mailbox server. Tactical Addresses assigned on the WL2K system for Section served-agencies or other functions may be shared on a Section list or posted on the ARRL Target Station database as appropriate. A national guidance has been developed to achieve some uniformity in the application of Tactical Addresses throughout ARES®, NTS, and the NTSD.

See the **MPG6A6** WL2K Tactical Address Guidance.

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**6.2.7 MESSAGE TYPES, ADDRESSING, CONFIRMATION**
*Radio-email* can carry a message in standard email format as well as ARRL Radiograms typed into the body text or attached in a text file. The **MPG6A8**, Batch File & Plain Text Guidance, gives the details on how to compose *Radio-email* of the various Types with respect to the Addressing, Subject Line contents, methods of entering Radiograms, and confirmation requirements.

Due to the flexibility of the WL2K system, the following message types are hereby defined for use in the ARES®, NTS, and NTSD *Radio-email* system:

**6.2.7.1 TYPE 1 - CARRYING ARRL TEXT RADIOGRAMS**
**ARES(r) - NTS - NTSD, TO ANY ONE TARGET STATION**
The standard ARRL text Radiogram (MPG-1) may be handled via NTS manual voice/CW nets and the NTSD as well as **via *Radio-email***. Radiograms may be entered into the body text of a *Radio-email*, or attached in text files in the plain text format (Subject: NTS), or attached in Batch File format (Subject: NTSD, required when sending Radiograms to NTSD MBO stations). A *Radio-email* carrying active Radiograms is considered Type 1, and must be sent to only one addressee to prevent duplicate handling of the Radiograms. Receipt of such *Radio-email* must be confirmed by reply *Radio-email*. Each individual Radiogram may only be delivered; sent on to another station via WL2K, the internet, via station-to-station transfer, NTSD, or manually; or be serviced back to the station-of-origin. See the **MPG6A8** Batch File & Plain Text Guidance, 6A8.1.

Active ARRL Radiograms carried via *Radio-email* are treated the same way as if transferred via manual nets or NTSD MBO services. They must be delivered, relayed on, or serviced back to the originating station. They count as QTC 1 for

each Radiogram passed whether sent in bulk via *Radio-email* or sent individually.

Radiograms may be entered in **plain text** in the *Radio-email* body or attached in text files. Booking is permitted in plain text Radiogram content carried by *Radio-email*. Such plain text submissions, which can be created and read in simple text editors, can be used to transfer one or more text Radiograms to stations anywhere.

The text **Batch File**, attached to *Radio-email*, carries text Radiograms in a format which can be directly imported into NTSD Winlink Classic MBO Message Managers for posting, downloading, sorting, and forwarding. Messages posted on the MBO may be exported in **Batch File** format for transmission as attachments to *Radio-email*. Such exported files, which can be created and read in simple text editors, can be used to transfer batches of text Radiograms to stations anywhere, including other NTSD MBOs. WL2K or station-to-station transfer of *Radio-email* may be used to move traffic between MBOs using the internet, packet radio, or HF, in order as appropriate to minimize spectrum congestion. **Booking is not permitted in Batch Files.**

Therefore, Radiograms created by any station in the ARRL Field Organization may be transmitted via *Radio-email* from anywhere to an ARES®, NTS or NTSD Target Station, using WL2K or station-to-station transfers, without the need for any intermediate manpower or nets, just as done with messaging in the email format.

### 6.2.7.2 TYPE 2 - WITH WL2K AND INTERNET ADDRESSES
### TO ANY TARGET STATION(S)

Messaging in the standard email format (**not containing active text Radiograms**) with multiple addressees, copies and binary attachments may be sent via WL2K to any ARES®, NTS, or NTSD client, via telnet/internet, packet, or HF; or sent through the WL2K public internet interface. Receipt of such *Radio-email* for the public or served-agencies may be confirmed, as deemed necessary, by reply *Radio-email* upon request. See the **MPG6A8** Batch File & Plain Text Guidance, 6A8.2.

Forms such as the ICS-213 (an interoffice memo form not for use on radio networks without additional fields), used in NIMS/ICS compliant communications, may simply be attached to *Radio-email* (in text format, preferred, as opposed to large document form files). Multiple form messages of that type to separate addressees may be included as multiple attachments in *Radio-email* to a single site client. Messages for multiple registered Tactical Addresses are posted on WL2K as though they were separate client accounts, but are delivered to the client station which registered them. Each Tactical Address client then collects its mail by accessing the amateur station's built-in Paclink server. (See **6.2.15**, ICS-213 Guidance below)

### 6.2.7.3 TYPE 3 - NO WL2K OR INTERNET ADDRESS (NEW)
### TO ANY ONE TARGET STATION

*Radio-email* Type 3 traffic (**not carrying active NTS text Radiograms**) is essentially a *Radio-email* transported Radiogram with a body text Preamble,

ARRL standard Radiogram Address, an **email formatted body text and attachments**, and a Signature. **Manual delivery is required**, and each such message shall be treated in a manner similar to ARRL Radiograms with respect to delivery, relaying and servicing. Multiple body text email messages may be included with certain precautions.

Type 3 *Radio-email* formatted messages for which no WL2K or public internet delivery address is available will be transferred to only one Target Station for delivery, manual forwarding to a station which can make delivery, or be serviced back to the Preamble originator. The message may be sent via WL2K or station-to-station transfer to one WL2K call sign client, or one WL2K Tactical Address client, or one public internet addressee (all in order to avoid duplicate delivery). Receipt of such a Type 3 *Radio-email* must be confirmed by reply *Radio-email*.

See the **MPG6A8** Batch File & Plain Text Guidance, 6A8.3.

### 6.2.7.4 TYPE 4 - FOR RE-FILING (NEW)
### TO ANY ONE TARGET STATION BY DIRECT TRANSPORT

**DESTINATION RE-FILING**
Messaging in email format **(not containing active NTS text Radiograms)** may be sent to any one Target Station by direct station-to-station transfer when access to WL2K Gateways is not possible. In such cases, the ultimate destination addresses - other Target Stations or any WL2K or public internet addresses - will be entered as the first lines in the body text of the *Radio-email* beginning with the group "**Re-file:**", followed by the address list, and then followed by a blank line. The address list may be marked for the ultimate addressees using **To:** and **Cc:** as needed, with the addresses entered such that they may be copied and pasted into a new *Radio-email* for re-filing. The receiving station may then easily re-file the message to the appropriate addressee(s).

Type 4 *Radio-email* for re-filing may include Type 2 and Type 3 *Radio-email* content. (Type 1 NTS and NTSD Radiogram *Radio-email* may also be transported station-to-station but they remain Type 1 traffic.)

See the **MPG6A8** Batch File & Plain Text Guidance, 6A8.4.

### 6.2.8 BATCH FILE & PLAIN TEXT GUIDANCE
The **MPG6A8**, Batch File & Plain Text Guidance support document, contains information in greater detail on entering text Radiograms in Type 1 *Radio-email* in both **plain text** format and the **Batch File** format; and includes guidance with respect to the **Addressing**, **Subject Line** contents and **confirmation** requirements for each type, including Types 2, 3 and 4 Radio-email

**6.2.9 WELFARE AND AGENCY TRAFFIC**

**6.2.9.1 WELFARE EMAIL**
All Section stations using *Radio-email* may provide direct email service to and from public internet addressees through the WL2K server firewall and spam filtered interface. Thus, the public may send email to loved ones and receive replies directly through an ARES® or NTS/NTSD field station without the use of intermediate manpower or nets. Welfare email can also be exchanged with the public at other locations where ARES® or NTS/NTSD stations are deployed. Such *Radio-email* for public internet addresses must be sent first from the WL2K client in order to establish the automatic permission in the client's white list for a reply. Otherwise, the WL2K client must first send a *system message* to the WL2K CMS to permit that internet address or domain access to its account through its white list. (White list entries may be added or deleted at any time through *system messages* to the CMS.)

Where WL2K network connections are not available within the "last mile", Section stations may use *Radio-email* station-to-station transfers to forward messaging to other stations which can **re-file** the messages onto the WL2K network or internet; or stations may use HF PacTor or WINMOR to reach WL2K HF Gateways anywhere in the country.

**6.2.9.2 WELFARE RADIOGRAM TEXT MESSAGING**
All Section stations that use *Radio-email* via WL2K or station-to-station transfers may create and attach **Batch Files** containing one or more text Radiograms which may then be inserted, without using intermediate manpower or nets, directly into NTSD MBO Target Stations for national distribution and delivery. (NTSD MBOs may accept Radiograms in plain text with appropriate permission.) Plain text and Batch Files may also be transferred to any other station using *Radio-email*, within the Section, the "last mile", or elsewhere, for delivery by any means available. Section stations may use *Radio-email* station-to-station transfers to forward such messaging to another station which can **re-file** the messages onto the WL2K network.

**6.2.9.3 WELFARE INQUIRIES**
The ARRL may provide a common web page accessible by the public on which to make welfare inquiries regarding victims in particular disaster areas. An interactive form may be provided to obtain as much information as possible about the parties of interest as well as complete information needed to re-contact the requesting party.

Such inquiries, including *Radio-email* and Radiogram inquiries from other NTS, NTSD, or ARES® stations, may be forwarded via *Radio-email* to Target Stations designated by Section staff in the affected area, provided that the local Section staff approves in advance. Such inquiries may be provided by the Section staff to local relief agencies in the affected area to be serviced. Generally, the Section SEC and/or STM will announce when the means are available to accept and service incoming welfare inquiries.

**6.2.9.4 AGENCY TRAFFIC**

All Section stations, or stations anywhere on the global WL2K network, using *Radio-email* via WL2K or station-to-station transfers, may create and send messaging in the standard email format, with or without text Radiogram **Batch Files**, to any agency provided with a properly equipped ARES® or NTS/NTSD station.

The objective of deploying *Radio-email* clients at such agencies is to provide total agency interoperability. Since officials may create and receive such messaging on their own computers and in the standard email format, no intermediate amateur relaying manpower is required other than the control operators at the end points of such communications.

Unique messaging formats required by some agencies may be used by the originating official, or amateur, couched in the standard email format body text or attachment. Thus, IC-213 or other similar message-blank formats may be attached with ease. Such forms may not, however, be used for public welfare traffic; and if they must be sent via manual nets for relay, they must be placed in the body text of a properly formatted Radiogram with a standard preamble, address and signature. It is more efficient to move such form traffic via Type 2, 3, or 4 messaging. See the section on ICS-213 Guidance, **6.2.15**.

**6.2.10 SPECIAL RADIO-EMAIL ROUTING CONSIDERATIONS**

Since the WL2K system and direct transfer capability is a national network in scope, clients anywhere can send *Radio-email* to Target Stations or other clients anywhere. WL2K provides for automatic and dynamic message routing - a client may connect via any portal and get its mail anywhere - fixed or on the move. (This is quite different than older home-BBS type messaging systems.)

**6.2.10.1 ARES®**

Properly equipped Section Target Stations and deployed ARES® teams can provide direct routing of *Radio-email* between served agencies, email service for the public requiring welfare support (through the WL2K protected interface with the public internet), and provide direct welfare Radiogram service through the NTS and NTSD Target Stations. Stations on the Local Area Network (LAN) can receive Radiograms via *Radio-email* for handling via HF and 2m/UHF manual nets, etc.

**6.2.10.2 NTS/NTSD**

Properly equipped Target Stations in the NTS and NTSD can provide *Radio-email* relaying (radio-all-the-way) and re-filing for all Sections as well as handling bulk transfers of text Radiogram traffic. This is in addition to handling daily routine Radiogram traffic. The stations and manual networks in the NTS and NTSD are a national resource to be preserved.

**6.2.10.3 LISTING RADIO-EMAIL TRAFFIC ON MANUAL NETS**

Stations holding *Radio-email* for distribution to variable or unknown Target

Station addressees may check into manual nets (voice, CW, etc.) where NCS stations may identify and assign the listed *Radio-email* traffic to other Target Stations present, and dispatch those stations to pass their *Radio-email* via the WL2K network or station-to-station as needed. This may be done on Section and Local nets, on NTS Region and Area nets, and on TCC schedules.

Bulk *Radio-email* attachments of Radiograms may be listed and dispatched in like fashion, and may also be broken into one or more Radiograms to be listed and sent via WL2K or station-to-station as needed. Radiograms are treated as individual messages whether carried in bulk or not, hence stations may need to divide bulk transfers as needed for listing and routing under manual net control, but bulk transfers between stations are still permitted.

All NTS Area and Region nets should encourage and register liaisons to the WL2K network (and NTSD), as well as those capable of station-to-station transfers of *Radio-email*, to interface with the NTS, NTSD and ARES® stations anywhere. NTS Target Stations checking into Area, Region and Section nets, including TCC members, may list *Radio-email* traffic to be assigned and dispatched to other properly equipped NTS or NTSD Target Stations checked into the nets. This can dramatically increase throughput on such nets, and is the only way to handle messaging in the *Radio-email* format.

Such traffic to be dispatched via WL2K or direct transfer may be listed on manual nets for a liaison or destination as follows:

1. **For station-to-station forwarding of Radio-email:**
   Use of "Radio-email" and "RE" denotes *Radio-email* messaging.
   Voice: [liaison] Radio-email [# of *Radio-emails*]...over;
     as in: "[call sign] Traffic First Region Radio-email twelve...over"
   CW: [liaison] RE [quantity of *Radio-emails*]...AR
     as in: "[call sign] QTC 1RN RE 12...AR," or "...Podunk RE 12...AR"
2. **For station-to-station forwarding for re-filing Radio-email onto WL2K:**
   Use of "Radio-email" and "RE" denotes *Radio-email* messaging.
   Voice: [WL2K] Radio-email [# of *Radio-emails*]...over;
     as in: "[call sign] Traffic WL2K Radio-email six...over"
   CW: [WL2K] RE [# of *Radio-emails*]...AR;
     as in: "[call sign] QTC WL2K RE 6...AR"
3. **For listing Radiograms for manual sending to a liaison for WL2K posting as a Radio-email plain text or Batch File:**
   Voice: [WL2K] [# of Radiograms]...over;
     as in: "[call sign] Traffic WL2K ten...over"
   CW: [WL2K] [# of Radiograms]...AR
     as in: "[call sign] QTC WL2K 10...AR"
4. **For listing bulk Radiograms to be passed via WL2K or direct transfer.**
   Here, the use of "Batch" is similar to listing books but implies that the Radiograms are held in a file to be exchanged via *Radio-email* if the NCS can identify a suitable Target Station assignee, dispatched as a "Batch of [#]"; otherwise the traffic must be passed manually.
   Voice: [liaison] Batch of [# of Radiograms]...over;

as in: "[call sign] Traffic Third Region Batch of ten...over," or
"...Baltimore Batch of ten...over"
CW: [liaison] Batch of [# of Radiograms]...AR;
as in: "[call sign] QTC 3RN Batch of 10...AR," or
"... Baltimore Batch of 10...AR"

5. **For listing bulk file Radiograms by destination/quantity.**
Listing Radiograms received in a *Radio-email* plain text or Batch File may
be done in a manner similar to listing Radiograms normally using the
destination and quantity. Listing using the word "Batch" denotes that the
Radiograms are in file format suitable for *Radio-email* transfer. If the NCS
can assign Target Stations for blocks of such traffic, the traffic may be
dispatched for transfer via *Radio-email* (WL2K or direct) as a "Batch of
[#]"; otherwise, the bulk traffic may be re-sorted and passed as smaller
blocks, or passed manually. Thus, such traffic in ready file format may be
listed as:
Voice: Batch of [# of Radiograms] [dest. qty.] [dest. qty.]...over;
as in: "[call sign] Traffic Batch of thirty...Baltimore twenty five...DC
five...over"
CW: Batch of [# of Radiograms] [dest. qty.] [dest. qty.]...AR;
as in: "[call sign] QTC Batch of 30...Baltimore 25...DC 5...AR"


## 6.2.10.4 SENDING A BATCH FILE ON VOICE AND CW

If a station brings bulk Radiogram traffic to a manual net already in the Batch File
format, wishing to send it manually to a station to forward via *Radio-email* to an
NTSD MBO Target Station, the Batch File may be sent as received.

In the ST line, the "@" may be voiced and sent on CW as "atsign", the "<" sent as
"less than sign", and blank lines may be sent as "blank line" on voice, <AA>
twice on CW. The text break (equal sign sent on CW) must be copied and entered
as BT on a line by itself. Care should be used to preserve group spacing on all
lines. See the **MPG6A8**, Batch File & Plain Text Guidance, 6A8.1.2.


## 6.2.10.5 NTSD MBOs

The NTSD MBO Target Station may continue to use HF PacTor transfers as
defined in Section 6.1 of this Chapter, but may also use *Radio-email* Batch Files
for bulk transfer of Radiogram traffic between MBOs using WL2K and
connections via telnet/internet, packet, or HF Gateways, and via station-to-station
transfer.

Transfers between NTSD MBOs via WL2K telnet connections, when available,
can dramatically lessen the impact on valuable packet and HF spectrum,
particularly when frequencies are needed for use by stations servicing the "last
mile".


## 6.2.10.6 NTS/NTSD WL2K ROUTING POLICIES

The NTS and NTSD staff shall set policies for routing choices, keeping in mind
the need to preserve the manual NTS and NTSD systems. For example, at the time
of writing, the NTS policy with respect to *Radio-email* transport of Radiograms is
for stations to use the normal NTS or NTSD routes as first priority, *Radio-email*

transport secondary, or as needed if normal NTS/NTSD routes are not available, or *Radio-email* formatted messaging must be moved.

## 6.2.11 SAR/PSHR REPORTING - NET TRAFFIC COUNTING

### 6.2.11.1 SAR/PSHR REPORTING
Consult with the NTS and NTSD staff regarding possible future special reporting credit for Radiograms handled via internet connections through WL2K.

**Type 1:** **Text Radiograms** transferred with *Radio-email* shall count toward SAR/PSHR reporting if passed by radio to/from the handling station - one point for each Radiogram handled (sent and received) whether individually or in bulk. Telnet/internet *Radio-email* transfers do not count. Origination from a third party counts as one point each (off-air). Delivery of such a message to a third party counts as one point each (off-air).

**Type 2:** *Radio-email* transferred shall count toward SAR/PSHR reporting if passed by **radio** to/from the handling station - one point for each *Radio-email* handled (sent and received), provided the content and attachments are for one addressee. If multiple attachments are included for separate addressees at the destination station, each separate attachment (such as several differently addressed ICS-213 forms) shall count as one point each (sent and received). Origination from a third party counts as one point each. Delivery of such message content to a third party counts one point each if this is done off-air after receipt of the *Radio-email*. (Thus, *Radio-email* received for an official or other third party, and posted on a local LAN for the account, or forwarded via a local digital network on site, can count for deliveries, but a *Radio-email* posted on WL2K or the internet for download directly by the addressee counts only in the sent category if by radio. The recipient may count such mail as received if it downloads the mail via an on-air mode.)

**Type 3:** *Radio-email* **for delivery to a standard ARRL Radiogram address** transferred by radio to/from the handling station shall count one point each (sent and received) just as though it was a Radiogram. Telnet/internet *Radio-email* transfers outbound or inbound do not count. Origination from a third party counts as one point each (off-air). Delivery of such a message to a third party counts one point each (off-air).

**Type 4:** *Radio-email* **for re-filing** transferred by radio to/from the handling station for one re-filing address onto WL2K, or for station-to-station transfer, counts one point each (sent and received). Any messages re-filed via telnet/internet connections to WL2K or the internet do not count. If there are multiple addresses included for re-filing multiple copies of the message separately, count one point for each address to which a copy is sent by radio, except one point (sent and received) if the message in its entirety is simply transferred on to another station by

radio for the ultimate re-filing to all the addressees. Telnet/internet *Radio-email* transfers outbound or inbound do not count for the primary message or any of the re-filed copies not handled by radio.

### 6.2.11.2 COUNTING RADIO-EMAIL TRAFFIC ON NETS & NTSD

*Radio-email* handled on the net may currently be counted as stipulated below only if dispatched during the directed net to be passed between the listing station and assignee by radio.

(Consult with the NTS staff about possible revisions in rules to account for all *Radio-email* formatted messaging and *Radio-email* carrying Radiograms handled to include WL2K exchanges via telnet/internet. If done, ADCs will likewise need to provide guidance for NTSD MBOs which transfer Batch Files of Radiograms via WL2K using telnet/internet on either or both ends of the path. It may become useful to provide statistics for *Radio-email* formatted messaging separately from the combined count of Radiograms and *Radio-email* given here.)

A *Radio-email* formatted message for one addressee is counted as QTC 1 each. A *Radio-email* with multiple addressees in the To and/or Cc lines still counts as QTC 1 if transmitted as an entity between stations. If the messages for each or some of the addressees are separated and transmitted separately, each separate *Radio-email* is counted as QTC 1.

A *Radio-email* carrying only Radiograms, in plain text or Batch Files, counts as QTC 1 for each Radiogram handled in the exchange. The *Radio-email* body text transmittal information does not count as a separate message for such Type 1 *Radio-email* exchanges.

A *Radio-email* carrying multiple attachments for separate addressees (such as ICS-213 forms for separate addressees) counts QTC 1 for each separate message carried in the attachments, plus QTC 1 for a body text message for the primary addressee (if present).

For example, the net traffic count is QTC 1 for each Radiogram transferred even if done in bulk with *Radio-email* by radio. A Batch File of 20 Radiograms dispatched at the direction of the NCS during the directed net counts as 20 messages passed, or, if broken into two batches of 5 and 15 each to separate stations, still counts as QTC 20 total. A *Radio-email* to one station carrying two separate ICS-213 forms to different addressees would count as QTC 2 for the net. A Type 4 *Radio-email* with any number of addressees, if exchanged by radio for re-filing as a single entity, would count as 1 *Radio-email* message exchanged.

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## 6.2.12 DEALING WITH INFRASTRUCTURE LOSS

### 6.2.12.1 NORMAL OPERATIONS

All Section clients can connect to the WL2K network via telnet/internet (built into the client software). If desired, they may also connect via packet radio to RMS-

Packet Gateways, or via PacTor or WINMOR to HF Tri-mode Gateways. These Gateways provide internet connections to the WL2K CMS servers. Clients may also transfer *Radio-email* station-to-station directly on packet or HF radio.

**6.2.12.2 NO INTERNET AT DEPLOYMENT SITE**
This is a typical application for ARES® deployments to shelters or agencies where internet service is not available, including mobile and portable operations, while the surrounding infrastructure is operating normally.

A client may use a packet connection, or HF PacTor or WINMOR connection using the appropriate client software, to any appropriate Gateway, or any direct WiFi link to the internet to use telnet to connect to the WL2K CMS.

Home and other stations throughout the jurisdiction may set up permanent WL2K RMS-Packet Gateways as part of the preparedness program, or they may set up ad-hoc Gateways using WiFi hot spots or home internet as needed. The deployed client simply connects by radio to any Gateway in range, or may elect to connect via WL2K RMS-PacTor or WINMOR Gateways located throughout the country. Backbones and digi-peaters may be used to extend the radio horizon of packet Gateways. As a last resort, the client may transfer *Radio-email* station-to-station via packet or HF with other stations in range for re-filing messages onto WL2K.

**6.2.12.3 NO INTERNET IN THE "LAST MILE"**
Areas of infrastructure loss usually have finite limits varying in size, of course, from one station up to many states. WL2K clients, Gateways and backbones provide a solution.

> **REACHING OUTSIDE:** Section packet stations may exchange *Radio-email* through WL2K RMS-Packet Gateways with functioning internet **outside** the limits of the "last mile" infrastructure loss (directly, or using backbones or digi-peaters), or may access WL2K directly via PacTor or WINMOR Tri-mode Gateways outside the "last mile" located throughout the country.

> **INSIDE THE LAN - BACKBONES:** RMS Packet Gateways with wide coverage are obviously desirable in the Local Area Network, but where the ARES® client station is beyond the direct radio horizon of any Gateways, the connection can be made by radio through digi-peaters (slow) or through node switches on a backbone. Multiple sites can be set up to switch packets from the client's station to a different band to be sent along the backbone to the Gateway. The Rose (hardware) and FPAC (software) switches with a dual frequency station, or Flexnet, can, therefore, be used to tie remote areas of the LAN to a functioning Gateway with a Relay server (see the next topic). Some existing packet radio backbones can be used for linking WL2K clients and Gateways. Backbones may extend across county and state boundaries and may be connected to numerous Gateways. This increases the probability of a client being able to connect to a Gateway with a functioning internet link to the WL2K CMS, or at least one with a Relay server module (which provides automatic *Radio-email* service between the clients reaching it). A mobile or permanent digi-peater or node station can be set up on the ground above that

difficult to reach river canyon, for example. Of course, a client anywhere at any time may use HF PacTor or WINMOR to reach WL2K through HF Gateways.

**RELAY LINKING:** When the "last mile" infrastructure fails throughout the LAN and at all the backbone sites, there are still solutions. All those clients able to reach an RMS-Packet Gateway with Relay can send *Radio-email* to each other automatically through that Gateway (the Relay acts as a *Radio-email* server when the internet fails). Furthermore, the Relay module at the Gateway can be linked via HF PacTor-III (SCS modem) to a distant RMS-PacTor Gateway on the WL2K system to handle *Radio-email* to and from areas outside the "last mile". Thus, the LAN may be structured to ensure that packet clients can reach one or more packet Gateways with a Relay module; and those few Relay stations provide local *Radio-email* service plus HF links to the rest of the system. For example, rural towns can set up packet or 802.11 local networks tied to a Gateway with Relay at a central hardened site which has an HF PacTor link to distant WL2K PacTor Gateways. RMS-Relay is now scheduled for use on Packet as well as HF Gateways, including the PacTor linking to another Gateway for out-of-domain messaging.

## 6.2.12.4 NATIONAL INFRASTRUCTURE LOSS

Although highly unlikely, in the event of national loss of all internet service, the Section ARES®, NTS, and NTSD team should be prepared to sustain agency and welfare *Radio-email* messaging services using the appropriate LAN deployment with packet Gateways/Relays and backbones, stations capable of HF PacTor or WINMOR, and stations capable of station-to-station transfers on packet and/or HF. Section Target Stations, in addition to their LAN services, must be available to receive and originate *Radio-email* for the served agencies and the public in their jurisdictions. RMS-Relay is now scheduled for use on Packet as well as HF Gateways, including the PacTor linking to another Gateway for out-of-domain messaging.

Target Stations in the NTSD are already equipped with the hardware required to handle *Radio-email* throughout the country, and to accept bulk transfers of Batch File Radiograms, using station-to-station transfers. Target Stations in the NTS should consider upgrading where necessary to be able to participate in nation-wide *Radio-email* station-to-station relaying, or to provide Gateway services, in addition to simply being able to exchange *Radio-email* via WL2K.

## 6.2.12.5 SUMMARY - ARES®/NTS EMCOMM MODE

Therefore, it is valuable to deploy RMS-Packet Gateway resources with RMS-Relay (including its HF PacTor outside connection) throughout the Sections, or packet node connections to such Gateways, in order to sustain LAN operations during infrastructure loss. Likewise, critical agency and administrative sites should be capable of reaching such functional Gateways via packet or reach WL2K via HF PacTor or WINMOR, or be the key hardened sites to run such resources. Section resources should be capable of reaching NTSD national resources via station-to-station connections. All stations participating in the emergency response should have the client application capable of station-to-

station transfers for internal backup and the means to reach the NTSD long-haul Target Stations. RMS-Relay is now scheduled for use on Packet as well as HF Gateways, including the PacTor linking to another Gateway for out-of-domain messaging.

With these integrated ARES®, NTS and NTSD resources, the ARRL can provide national, virtual real-time messaging in the email format in order to help ensure total agency interoperability and public welfare service. During major loss of infrastructure within the "last mile" of any size, these resources become active in the ARES®/NTS EMCOMM mode. The NTSD provides national long-haul *Radio-email* messaging, station-to-station, in this mode. Heightened alert levels will be activated at requisite Target Stations by Section staff and the national NTS and NTSD staff as necessary.

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## 6.2.13 MANUAL MESSAGING ISSUES
Providing successful real-time messaging depends in large part on issues involved in the process of delivery of both Radiograms and *Radio-email*.
- Originators need to get outbound NTS Radiograms and Type 3 *Radio-email* into the hands of stations for movement around the country. Within the "last mile" disaster area this needs to be done without encumbering limited local manpower or nets. WL2K can provide the path for such traffic to reach the NTSD or NTS Target Stations.
- NTS, NTSD, and other Target Stations need to route volumes of Type 1 Radiogram traffic and Type 3 *Radio-email* traffic as quickly as possible into all delivery areas within Sections nationally. Sections need to distribute or post messages requiring manual delivery within reach of local nets and experienced operators for delivery. Section Target Stations on WL2K can provide the path for such traffic. Automatic routing of such messages is always limited by the uncertainty of knowing exactly which stations can deliver a given message in a local calling area at a given hour. Target Stations may be activated and make themselves known to Target Stations elsewhere to facilitate this process. A dynamic ARRL Target Station database can facilitate this awareness. Section and local manual nets are often used to hand off such messages for local delivery by experienced operators. Net controls can determine which Target Stations are active and present on the net(s).
- *Radio-email* to WL2K clients (and public internet clients) is delivered only if the addressee checks for mail. Designated Target Stations may be activated to monitor the networks for mail; hence the concept of Target Stations brings with it the need to know which stations are active. A dynamic Target Station database can facilitate this awareness.
- Digital Relay Stations (DRS) may selectively download text Radiogram messages from NTSD MBOs for delivery. WL2K can provide the path for *Radio-email* traffic directed to *Radio-email* capable Target Stations as well as the transfer of Radiogram traffic via *Radio-email* between NTSD MBOs.
- Stations within the "last mile" disaster area also need to be able to receive large volumes of incoming welfare inquiries to be processed by sheltering agencies, or

delivered with replies, and handled without encumbering local limited manpower or nets. Target Stations at shelters can manage this real time with *Radio-email*. Designated Section Target Stations on WL2K within the "last mile" can provide the inbound path for such traffic.

WL2K comes into play by providing a real-time network capability to move *Radio-email* automatically to Target Stations. Thus, large volumes of traffic may be transported via WL2K *Radio-email* from originators and to outlets within minutes anywhere in the country. No intermediate amateur relaying manpower is required for reaching properly equipped outlets or MBOs directly. NTSD MBO operators will be able to manually post received messages for download with minimal effort. Section ARES®, NTS and NTSD stations; NTS Region, Area and TCC; and Region and Area NTSD MBO and DRS stations may all operate on the same real-time communications layer. All of this, however, requires having Target Stations available where the agency communications and message deliveries are necessary. The WL2K network is up and running 24/7. Delivery of *Radio-email* and Radiograms then depends most critically upon having Target Stations throughout the Field Organization equipped and trained in using the network.

Methods are also available to do this **radio-all-the-way** through manual management of WL2K resources by the ARES®, NTS and NTSD even in the most severe case of total national loss of communications infrastructure. The NTSD is active in providing this function nation-wide.

Designating stations to be the outlets is the key. The local Target Stations are the roots of the system, and, properly equipped, they can handle messaging in the email format, provide total agency interoperability, and handle messaging requiring manual delivery.

**6.2.14 ARESMAT**
ARESMAT teams should be trained and equipped to enter the "last mile" able to operate with WL2K *Radio-email* via telnet, packet on 10m, 6m, 2m, and 220 and 450 (1200b AFSK and 9600b FSK), and multi-band HF; be prepared to set up RMS-Packet Gateways with Relay including the HF link to WL2K Gateways; be prepared to handle *Radio-email* station-to-station via packet and HF PacTor or WINMOR; set up and use backbone nodes and digi-peaters; and use 802.11 linking and WiFi hot spots (for ad-hoc Gateways, local area networks, and internet browsing) and/or ship/aircraft relays.

Being WL2K ready ensures that the team can become an essential resource for re-establishing WL2K LAN functions, or establishing them ad-hoc, to sustain total agency and welfare interoperability in the affected area using *Radio-email*. The *Radio-email* system also provides the team with ready access to the leadership within the "last mile" and the means to communicate with their "home" leadership and other League resources. Such capabilities interface well anywhere in the country due to identical technology and equipment requirements.

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**6.2.15 ICS-213 GUIDANCE**
The NIMS/ICS ICS-213 message form, and similar forms used by various agencies for internal communications in a preferred format, is not designed for tracking and logging in radio networks. Guidance for transmitting such forms in the ARRL Field Organization follows:

**6.2.15.1 POINT-TO-POINT TRANSFER**
The ICS-213 (etc.) form contents as written may be transmitted from an originating station directly to a receiving station having a blank copy of the form, as is frequently done for other government or agency forms (such as situation reports, etc.). It is assumed that both stations are familiar with the form, and are familiar with how to identify the blocks of the message being transmitted. Care must be taken to use transmitting protocols to ensure exact copy of the message contents at the receiving end. General voicing and CW protocols may be used for transmitting the groups of the message as noted in Chapters 2 and 3 of the MPG. The military-like use of the introducer "symbol for ___" may be used to articulate colons and other punctuation. Of course, a direct packet radio or *Radio-email* connection between the stations may me used to transfer the form contents.

**6.2.15.2 RELAYS THROUGH MANUAL NETS/STATIONS**
If the contents of an ICS-213 form (etc.) must be sent through intermediate manual relaying stations on Local, Section, or nation-wide NTS nets and NTSD, a Radiogram must be created with a valid preamble, address of the destination station or site, the ICS-213 contents entered into the text block, and a valid signature, including, as necessary, Op Notes and full a signature with return address, phone and/or email contact information. The Radiogram received-from and sent-to record sections must be completed. The ICS-213 contents must be modified to comply with Radiogram punctuation rules for the text so that standard voicing or CW transmission methods may be used. This can be cumbersome, but

the ICS-213 itself is not suitable as a radio communications format, lacking the tracking and record attributes of the standard ARRL Radiogram.

### 6.2.15.3 RADIO-EMAIL TRANSFER

By far, the most effective method for transferring the ICS-213 form (etc.) is to simply attach the contents file to a *Radio-email* to be sent via WL2K (telnet, packet, or HF access to the system), or sent via station-to-station transfer of the *Radio-email* via packet or HF. If the recipient has no WL2K or internet link on site, Type 3 *Radio-email* may be used to move the form messaging to a relay station capable of making direct delivery to the addressee(s). If the originator has no WL2K or internet link on site, it may use Type 4 direct station-to-station transfer to move the form messaging to a relay station capable of re-filing the traffic onto the WL2K network or internet.

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